

A Study of Job Burnout in Technical Writers and Technical Illustrators/Designers at Lawrence Livermore National Laboratory, Livermore, CA

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U.S. Department of Energy

Lawrence
Livermore
National
Laboratory

June 3, 1998

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Work performed under the auspices of the U. S. Department of Energy by the University of California Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

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at Lawrence Livermore National Laboratory, Livermore, CA

Submitted by

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June 3, 1998

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CHAPTER I

Introduction

Background

According to the American Institute of Stress, job stress is estimated to cost American industry more than \$200 billion a year. These costs are, in part, related to the estimated 1 million employees that will be absent on an average workday because of stress; 75 percent of visits to primary care physicians are for stress-related problems. California workers' compensation claims for stress cost \$1 billion for medical and legal fees alone (Murphy, 1997).

But, there is another dimension to stress that needs to be addressed. Job stress can be a precursor to job burnout. Burnout is a loss of motivation, and antidotes for job stress will not necessarily alleviate or stop job burnout. Job burnout is experienced as exhaustion on physical, emotional, and cognitive levels. Burnout can include withdrawal and decreasing involvement on the job, seriously affecting job satisfaction, turnover, absenteeism, and productivity (Dwyer & Ganster, 1991; Erickson & Gunderson, 1972; Spector & Jex, 1991).

Burnout differs from occupational or job stress in its relation to work that requires intense involvement. While occupational stress is described as an imbalance of occupational demands and available coping resources, burnout includes feelings of exhaustion with involvement in work, and with a sense of accomplishment (Maslach, et al., 1996). Burnout has been confirmed as a complex three-factor syndrome encompassing depression, anxiety, and anger (Leiter & Durup, 1991). These feelings are contrary to socially accepted professional thoughts, and can lead to stigma for anyone experiencing these symptoms.

One of the original theories on burnout was that it is a process or sequence of the three

components, emotional exhaustion (EE), depersonalization (DP), and diminished personal accomplishment (PA) (Maslach, 1982). Others disagreed with that theory, saying that there is no fixed sequence; that one component is not an inevitable consequence of another (Schwab & Iwanicki, 1982). Another theory was that there are eight phases. Each phase *includes* a combination of either high or low emotional exhaustion, depersonalization, and personal accomplishment, and it corresponds to a higher total burnout level than the preceding phase (Golembiewski & Munzenrider, 1988).

Maslach (1993) still supports the theory of a sequence. Maslach, et al. (1996), developed surveys to assess burnout in the human services and education. Most recently, these researchers developed a survey for general use (Maslach, Jackson, & Leiter, 1996). The categories assessed in this general survey are exhaustion (EX), cynicism (CY), and professional efficacy (PE) (see Definition of Terms, p.5).

The research project described in this paper examined whether job burnout exists in the technical writer and technical illustrator/designer occupations in the Technical Information Department at Lawrence Livermore National Laboratory. This study also determined at what age and after how many years of service these employees were most likely to experience job burnout, whether it affects men or women most, and if writers in a technical organization experience job burnout more than illustrators/designers in that organization.

Statement of the problem

Studies have been carried out to assess burnout in many human services professions, such as teachers (Russell, Altmaier, & Velzen, 1987), health care workers (Landsbergis, 1988), and social workers (Freudenberger, 1974). These studies do not take into consideration the fast-growing technological area in today's workforce. The wide-spread use of computers and the fast

pace needed for learning and updating skills, plus the need to be competitive in order to find and keep a job, present a special problem in the current and future workplace. Prevalence of burnout in technical professions was studied several years ago, but these studies just touch the surface of the problem. Studies have been done on information systems managers (Weiss, 1983), male and female engineers (Etzion, 1988), and software development teams (Sonnentag, S., Brodbeck, F., Heinbokel, T., & Stolte, W., 1994). Now it is time to take into consideration and to study the problem of job burnout in other technical professions.

Purpose of the study

The specific objective of this study was to utilize the Maslach Burnout Inventory-General Survey (MBI-GS), from Consulting Psychologists Press, Palo Alto, CA, in order to determine the extent of burnout in the technical writer and technical illustrator/designer professions at Lawrence Livermore National Laboratory (LLNL), Livermore, CA. The survey was developed by Schaufeli, Leiter, Maslach, and Jackson, to assess respondents' relationships with their work "on a continuum from engagement to burnout." Engagement is defined as an energetic state in which one is dedicated to excellent performance of work and confident of one's effectiveness. Burnout is a state of exhaustion in which one is cynical about the value of one's occupation and doubtful of one's capacity to perform (Maslach, et al., 1996).

Research questions

Four questions were the main focus of this research project:

1. To what extent does job classification, specifically technical writer and technical illustrator/designer, impact job burnout as measured by the subscales (EX), (CY), and (PE) on the MBI-GS?
2. To what extent do these technical occupations impact job burnout in males? In females?

3. To what extent does age impact job burnout in technical writers and technical illustrators/designers?

4. To what extent does years on the job impact job burnout?

Importance of the study

Rather than treating job burnout as something that detracts from the character or reputation of an employee, supervisors need to be aware of signs and causes of job burnout in order to prevent its occurrence. They need to realize that job burnout differs from job stress. The first step is to recognize that burnout can, does, and will happen. There is great concern today about the impact of working conditions on the health and well-being of employees. Many companies have employee assistance programs to help workers deal with stress, drug and alcohol problems, family crisis, and so on. But, the “cure” for job stress is not necessarily the cure for job burnout. Some companies are losing the talent and expertise of employees who were once dedicated and committed. It is the intention of this researcher to enhance awareness of the possibility of job burnout.

Scope and limitations of the study

The findings of this research project were specific to the Lawrence Livermore National Laboratory Technical Information Department technical writers and technical illustrators/designers. The culture at this laboratory may be significantly different from other technical organizations, since it is a government-contracted, university-managed, research and development organization.

One limitation that I find with the survey is that it is heavy on negative emotion questions. Out of 16 questions, 10 are negative aspects of the respondent’s emotions about their work. This may not have given employees a chance to express the positive feelings they have about their job.

Another limitation could be that, in spite of the guarantee of anonymity, there may have been a tendency on the part of respondents to answer the questions in a more positive manner in order to make themselves appear to be happy in their job.

Definition of terms

These terms are defined in the Maslach Burnout Inventory Manual (Maslach, et al., 1996).

Cynicism (CY) - indifference or distant attitude towards work

Depersonalization - negative, cynical attitudes and feelings

Emotional exhaustion - depletion of emotional energy, distinct from mental fatigue

Exhaustion (EX) - fatigue

Job burnout - State of exhaustion on an emotional, physical, and cognitive (perception, memory, and judgment) level.

Occupational or job stress - an imbalance of occupational demands with available coping resources

Personal accomplishment (PA) - feelings of competence and achievement in one's work

Professional efficacy (PE) - expectations of continued effectiveness at work

General job descriptions for classifications surveyed

The following job descriptions are general duties required for each classification. The full descriptions (not given here) include specific computer techniques and knowledge for different categories of each classification, plus level of understanding of LLNL and programmatic operations.

Technical writer - Demonstrates sensitivity to the nuances of written English. Edits skillfully, writes well, uses correct grammar, spelling, punctuation. Understands the procedures and technology of the conventional publication process, including typography, composition and proofreading, processing of illustrations and photographs, layout, and printing. Understands the procedures and technology of electronic publishing.

Technical illustrator - Applies appropriate illustration techniques (using orthographic, isometric, and perspective projections from various input including engineering drawings, rough sketches, and verbal input). Designs and constructs posters, display work, and signs from customer specifications, including nonstandard/custom use of related materials, tools, and machines. Manually produces non-computer color art, using a variety of media. Demonstrates knowledge of photographic and printing requirements. Coordinates and schedules jobs. Estimates work accurately, including revising estimates and communicating unexpected changes to appropriate personnel.

Designer - Applies appropriate design principles. Converts rough customer input into a finished design. Generates multiple design solutions. Presents creative design solutions to client. Understands basic printing functions. Understands photographic requirements at a sufficient level to order products and/or services. Designs and coordinates electronic on-line and traditional publications. Designs and coordinates projects involving posters, display work, and signs from the customer's specifications. Estimates work accurately, including revising estimates and communicating unexpected changes to appropriate personnel. Understands TID/GPO publication requirements. Plans, directs, and coordinates the production of several complex projects concurrently; participates effectively in preproduction meetings.

CHAPTER II

Literature Review

In reviewing literature on job burnout, little research was found that relates to the study of technical organizations. Four of the papers reviewed were written in the late 70s and the 80s, which shows that more and current research needs to be done in the area of technical occupation burnout. Earlier studies in the human service occupations broke ground for current studies of technical professions.

One of those earlier studies, by Jackson, Schwab, and Schuler (1986), invited 700 members of the New Hampshire chapter of the National Education Association (NEA) to participate in a study of teachers' job attitudes. Jackson et al. hypothesized that both unmet job expectations in general and specific aspects of employees' job experiences would be associated with burnout. They used the three-component, psychological syndrome of emotional exhaustion, depersonalization, and feelings of low personal accomplishment (Maslach & Jackson, 1981). Three hypotheses were predicted: 1) Emotional exhaustion will be associated with (a) unmet organizational expectations, and (b) job conditions that directly increase the amount of emotional energy needed to do the job; 2) Feelings of low personal accomplishment will be associated with (a) unmet organizational expectations and (b) job conditions that imply one's efforts are ineffective and/or unappreciated; and 3) Feelings of depersonalization will be associated with (a) unmet organizational expectations and (b) job conditions that place heavy demands on emotional reserves.

Jackson et al. specifically examined whether burnout triggers the process of changing jobs. They predicted that burnout would be associated with "cognitions and behaviors related to eventual leaving." Hypotheses related to leaving one's job were: 1) Burnout will be associated

with preferring to be in a different job; 2) Burnout will be associated with thinking about finding a new job; 3) For those who consider changing occupations, burnout will be associated with receiving training for a new career; 4) For those who consider a job change, burnout will be associated with actively searching for a new job; 5) Burnout will be associated with intentions to leave one's job; and 6) Burnout will be associated with voluntarily leaving one's job.

The 10 percent sample was randomly selected through available demographic data. The typical respondent was typical of the national demographics for that profession—median age was 36, 74 percent were female, and median level of teaching experience was 11 years. Data was collected by mail two times. The first time, 327 of the 700 teachers completed a 16-page survey that had mailed to their homes. Questions were directed to research the match between current job conditions and prior expectations for the job, and feelings of burnout. One year later, the 327 respondents were sent a follow-up survey. Those who were still employed as educators were asked to indicate the types of jobs they would most like to have, whether they considered leaving their jobs, whether they had received training for a new occupation, whether they had searched for new jobs, their intentions to leave, and burnout symptoms. Those no longer employed in education were asked to indicate their reasons for leaving their previous jobs.

Hypotheses 1, 2, and 3 specified conditions believed to foster burnout. They were tested using hierarchical regression analyses. According to Jackson et al., Hypothesis 1 was partially supported, hypothesis 2 was also partially supported, and hypothesis 3 was not supported. For hypothesis 4, preferred job status would be related to Time-1 (survey one) burnout was supported for all three components of burnout. Three parallel regression analyses were conducted to test hypothesis 5. Burnout scores were not significantly related to considering finding a job in education administration. The regression analysis data yielded support for hypothesis 6; regression results did not provide support for hypothesis 7; scores yielded marginal support for hypothesis

8; and, because of a very low rate of turnover in the sample, tests of hypothesis 9 “severely lack power.” This empirical study was just one of many that researched human service professions and provided groundwork for current studies of burnout in technical professions.

A more current project by Sonnentag, Heinbokel, and Stolte (1994) investigated the stressor-burnout relationship within software development teams. Sonnentag et al. were interested in the long-term effects of working conditions and whether burnout occurs in technical professions. The total sample for the study was 200 people, which included 29 software development projects at 18 German and Swiss companies. Mean project size was 10 members and there was an average of 74 percent participation in a given project. This was a representative sample of software development professionals, from systems analysts to administrative. But, studying teams rather than focusing on individual occupations could be a limitation on the effectiveness of outcomes. Focusing on individual job classifications in separate studies would provide a better comparison and understanding of burnout in these technical occupations.

Questionnaires and interviews were used to test five hypotheses for the study. Cognitive, learning and communication requirements were ascertained during an interview, while burnout was assessed with a 16-item measure based on the Maslach Burnout Inventory. Variables for data collected included: stressors, such as workload, responsibility, and opportunity to grow; other work characteristics, such as control, complexity, and learning requirements; and quality of team interaction, such as democracy, openness to criticism, and competition.

The authors cite a limitation of one interview, in that questionnaires were filled out and returned after the interview. Out of 186 people interviewed, only 166 returned the questionnaires. Sonnentag et al. (1994) also felt that a weakness of questionnaires lies in possible individual response biases, leading to an overestimation of the correlations between two variables. In order to rule out that possibility, aggregated measures were used. Main and moderator effects were

found, indicating that not all results were due to individual response biases. This study showed burnout to be a relevant psychological strain variable in the technical field.

Another study of relevance is one by Etzion (1988). Etzion studied burnout in male and female engineers in the context of work/non-work success. The paper explores burnout and success in the professional and private lives of engineers. Specifically, the question was: What is the relationship between burnout and the totality of work and non-work experience of men and women in engineering careers? The hypothesis was that the uniqueness of the burnout concept lies not with its psychological or physical expressions, but with its special sources and the way it develops.

Participants in this study included 51 male and 51 female engineers who were matched by profession, task, age, seniority, training, job experience, and organizational context. Sample women were drawn from two technical associations. They were then asked to give a questionnaire to two male colleagues close to their age and experience. One-hundred-forty-nine matched pairs were found and fifty-one pairs were chosen for this study.

In addition to demographic and background information, a questionnaire was given to participants, which included items concerning perception of present job, self-assessment, evaluation and importance of success in work and non-work areas, interest and involvement in work and non-work areas, extent of overlap or invasion of work and non-work areas, physical health, and measure of burnout and enjoyment.

Burnout was measured by the Pines 21-item index; a 20-item measure of enjoyment was integrated between the burnout items in the questionnaire. According to Etzion, on most of the variables, the comparison between men and women gave nonsignificant results. No significant gender differences were found either on burnout, enjoyment and job satisfaction, or on perceived

success and the importance of success, both at work and outside of work.

The only significant differences were that (a) men, more than women, perceived in their present job an opportunity for high earnings, (b) men attach greater importance to the opportunity to develop technical expertise, and (c) men assessed themselves higher on the ability to make decisions and on overall self-confidence.

The technical occupation of Information Systems (IS) managers was studied by Weiss (1982). She investigated organizational stress among IS managers in both governmental and private organizations. Weiss specifically studied the resulting symptoms of strain and whether social support can reduce symptoms of strain. According to Weiss, there was growing evidence implicating stress as the cause of health problems, such as coronary heart disease, gastrointestinal malfunction, cancer, severe nervous conditions, and neuroses. Job stress had also been linked to job dissatisfaction and reduced productivity. She felt that the results of the study could provide a foundation to develop strategies for reducing and alleviating stress and its impact.

A survey questionnaire was sent to 415 subjects, many of whom were members of the Society for Information Management. The response rate was 72 percent, or 297 responses. It turned out that 56 respondents were not IS managers, so that 241 respondents were used in the analysis. The mean age of the respondents was 42.5 years, 83 percent were male, and the education level was high (56 percent held Masters Degrees and 7 percent held Doctoral Degrees). Thirty-four percent of the IS managers were in the vice president or director category.

Eleven sources of stress were used as independent variables. They were: overload, role ambiguity, role conflict, responsibility for people, participation, lack of feedback, keeping up with rapid technological change, being in an innovative role, career development, organizational structure and climate, and recent episodic events. The dependent variables were (1) job dissatisfaction and (2) psychological and physiological symptoms of strain.

Likert scale scores were used to index each variable. Multiple regression statistical techniques were used to analyze the relationships between the various indexes. The indexes were then compared across equations as well as across variables.

Weiss proposed three hypotheses:

Hypothesis 1 - Job stresses among IS managers are positively related to psychological and physiological strains.

Hypothesis 2 - The level of social support among IS managers is lower than the level of social support among other managers.

Hypothesis 3 - When social support exists, it reduces strain among IS managers.

Weiss concluded six principal findings from this study and they are:

1. Job stresses among IS managers are positively related to psychological and physiological strains.

2. Certain stressors have the greatest impact on psychological and physiological strain among IS managers. They are role ambiguity, lack of feedback, career development, and organizational structure and climate.

3. Type A (coronary-prone) personality patterns have a significant negative relationship with psychological and physiological strain among IS members.

4. Age has a significant negative relationship with psychological and physiological strain among IS managers.

5. Certain psychological and physiological strains are more prevalent than others among IS managers. They are letting things slide, feeling restless and unable to concentrate, being less communicative, feeling irritable, eating too much, feeling tense (uptight, fidgety, nervous), having an increased interest in sex, feeling tired, having misdirected anger, and job dissatisfaction.

6. The level of social support among IS managers is lower than the level of social support among other managers. Other research (Holdorf, 1975) also provided evidence that stress can lead to deteriorated interpersonal relations.

According to Weiss, the findings of this study were both statistically significant and consistent with previous research on managers and other workers in general.

Bailyn (1977) used the, at that time, current debate about the role of work in people's lives as background to study alienation from work as opposed to intense involvement with work (workaholism). While Bailyn's research does not directly study stressors and job burnout, there could very well be a connection between the "alienation from jobs" that she discusses and the "depersonalization" measured by studies on job stress and burnout.

Bailyn studied a group of highly educated, technically trained people in their late thirties and early forties. She surveyed three classes of alumni of the Massachusetts Institute of Technology; the alumni graduated in 1951, 1955, and 1959. The more than 1,300 male respondents had "pursued a rigorous course of technical study." Bailyn's research looked at the relationship these men had to their work from the point of view of involvement and from that of accommodation. The intent was to establish the extent to which these technically trained people were involved with their work, the extent to which they accommodate to the needs of their families, and to investigate the correlates of these attitudes and their interrelation with each other.

The measure of involvement was derived empirically from a survey which asked questions regarding work orientation, such as 'I like to think about my work, even when off the job' and 'I wish I were in a completely different occupation.' The survey also asked respondents to choose 'Which three aspects of your life give you the most satisfaction?' including career, family, leisure, etc. After determining the distribution of the involved group compared to the

uninvolved group, Bailyn looked at how the two groups differ. She presented a Table showing percentage of answers from each group on job satisfaction, perceived success, reaction to change in work, and job permanence (percentage expecting to stay in their present jobs).

Some results from the involvement survey were that (1) graduates of the Schools of Engineering and Management end up less involved with their work than do alumni who majored in the sciences or in architecture, (2) the more graduate education an alumnus received, the more likely he is to be involved with his work, and (3) those whose first jobs were in science, as opposed to engineering or management, were much more involved with their work over a decade later. Bailyn also selected sub-groups with uniform backgrounds to do measurements on involvement in engineering-based careers and she isolated conditions such as salary.

The measure of accommodation is more theoretically based. According to Bailyn, most of the work that had been done at that time on men's strategies for reconciling career and family demands concentrated on the effect on family. Bailyn limited her study to currently married respondents, which included over 90 percent of the total number surveyed, and tried to classify them according to the extent to which they accommodated their careers to the needs of their families. The respondents answered four questions regarding areas of their lives that gave them the most satisfaction, importance of a job that gives sufficient time for family and personal life, aspirations for career, and importance of success at work.

The accommodators rated family relationships among the most important source of satisfaction and the nonaccommodators rated their careers among the main source of satisfaction. It was found that the nonaccommodators were more 'scientifically' oriented, the accommodators more 'humanistically' oriented. The nonaccommodators seemed to function best professionally.

The study found that a high degree of involvement in work seems to be required for

optimal professional functioning and that from a family relations point of view accommodation is a more successful strategy. In some cases where accommodation is accompanied by great self-confidence, professional performance is not adversely affected. Accommodative employees are more loyal to their organizations than nonaccommodative employees. Accommodation may be a functionally efficient response to an inevitable 'plateauing' which occurs for most people in all occupations. Bailyn suggests that there is such a variance from workaholism to rejection of any involvement with work that organizations should devise policies that have sufficient flexibility to benefit from individual needs.

Considering the consequences of job burnout, such as health problems, job dissatisfaction, absenteeism, and turnover, this research will have practical benefit for organizations in anticipating and alleviating job burnout.

CHAPTER III

Research Methods

Introduction

This study is a quantitative quasi-experiment. Subjects for this study are technical writers and technical illustrators/designers in the Technical Information Department at Lawrence Livermore National Laboratory.

The Maslach Burnout Inventory-General Survey (MBI-GS) was used. The MBI-GS measures job burnout, with subscales to assess exhaustion (EX), cynicism (CY), and professional efficacy (PE). A demographic survey contributed to assessing to what extent job classification, gender, age group, and years in current job impact job burnout.

Operational definitions

Independent variables

- 1) Job classification
- 2) Gender
- 3) Age group
- 4) Years in job

Dependent variable

- 1) Burnout test scores

The MBI-GS survey assesses to what degree respondents experience

- a) exhaustion (EX) - fatigue
- b) cynicism (CY) - indifference or a distant attitude towards work
- c) personal efficacy (PE) - expectations of continued effectiveness at work

Subjects

Forty-one (41) technical writers (26 women and 15 men) and 43 technical illustrators/designers (15 women and 28 men) in the Technical Information Department at Lawrence Livermore National Laboratory were surveyed. Subjects were asked to fill out a demographic survey along with the MBI-GS survey. There was a 64% response rate (54 respondents).

Instrumentation

The MBI-GS measures job burnout, with subscales to assess exhaustion (EX), cynicism (CY), and professional efficacy (PE). In *The Measurement of Experienced Burnout* (Maslach & Jackson, 1981), the authors describe how they developed the Maslach Burnout Inventory (MBI), a scale designed to assess various aspects of the burnout syndrome. Although the survey was originally developed and administered to human services professionals, a more recent version has been developed for general use.

The initial research relied on interviews, questionnaire surveys, and observations. Stressors in the work environment, such as workload and ambiguity, were assessed. The generally consistent pattern of findings from these studies led Maslach & Jackson to formulate a syndrome of burnout and to devise an instrument to assess it. Three subscales emerged from their data analysis: emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA).

Through interviews and questionnaires, the team collected data about attitudes and feelings that characterized a burned-out worker. They also reviewed established scales for useful content, although nothing was used exactly as found. Each item on their scale was written as a statement, with ratings for frequency and intensity. The first MBI contained 47 items and was given to 605 people. The team selected criteria, such as large range of subject response, low percentage of subjects checking the 'never' response, and a high item-total correlation, and the items were then reduced to 25. The 25-item survey was given to a new sample of 420 people.

The results of analysis on this second set of data were very similar to the first. The two samples were then combined for a final analysis. The results were similar for both the frequency and the intensity ratings. The three subscales of (EE), (DP) and (PA) emerged.

Results of correlations between frequency and intensity showed a moderate relationship between how often one experiences various feelings and how intensely they are felt. Subjects often indicated that they were pleased with the two-dimension format, because it allowed them to give a truer response. Therefore, a two-dimension format for each item was retained in the final MBI. Reliability of the MBI was calculated by a test-retest using a new sample group and testing them in two sessions at an interval of 3 weeks. Convergent validity was checked by correlating scores with (1) ratings made independently by a person who knew the individual well, (2) the presence of certain job characteristics that were expected to contribute to burnout, and (3) measures of various outcomes that had been hypothesized to be related to burnout. Maslach & Jackson (1981) reported that all three sets of correlations provided substantial evidence for the validity of the MBI. Another test of validity was obtained by comparing subjects' scores on the MBI with those on the Job Diagnostic Survey developed by Hackman & Oldham (1974).

Maslach & Jackson (1981) felt that it might be argued that scores on the MBI would be subject to distortion by a social desirability response, since many of the items describe feelings that are contrary to professional ideals. To test this idea, they asked 40 graduate students in the human services field to complete the MBI and the Crowne-Marlowe Social Desirability (SD) scale. The results showed no correlation between the two tests, supporting their hypothesis that burnout is not influenced by a social desirability response.

In conclusion, demographic data from the original sample of 1025 people showed that the sample was drawn from a wide range of human service occupations all over the United States.

There was a relatively equal number of males and females, and married and unmarried respondents. The subjects were predominantly Caucasian and highly educated. Maslach & Jackson (1981) report that some interesting findings emerged from the demographic data, but they feel that the findings must be interpreted with caution since some of the variables are clearly confounded with type of occupation and gender. Results showed differences in scores for men and women on the MBI subscales; patterns of burnout varied by age; more education was associated with higher scores on (EE), however the reverse was true of (DP); and, marital status was significantly related to (EE), but not to the other burnout subscales.

Although the MBI was initially developed for research in the field of human service providers, the need for a scale that measures burnout in other occupations prompted the development of the MBI-GS (general survey). The MBI-GS defines burnout as a crisis in one's relationship with work, not necessarily as a crisis in one's relationship with people at work (Maslach, et al., 1996). According to Maslach et al. (1996), burnout is a state of exhaustion in which one is cynical about the value of one's occupation and doubtful of one's capacity to perform.

The MBI-GS has three subscales that parallel the original survey, exhaustion (EX), cynicism (CY), and professional efficacy (PE). In the MBI-GS, the EX items are generic, without the original emphasis on emotions and without direct reference to people as the source of the feelings. Cynicism was introduced in place of depersonalization. Depersonalization is the quality of burnout that is most exclusively associated with human service work. Cynicism reflects indifference towards work. Professional efficacy is similar to personal accomplishment; however, it focuses more on expectations and explicitly assesses an individual's expectations of continued effectiveness at work.

On the MBI-GS, the strongest correlations are between exhaustion (EX) and cynicism

(CY) and the weakest are between exhaustion (EX) and professional efficacy (PE). The correlations between cynicism (CY) and professional efficacy (PE) are slightly weaker than those between exhaustion (EX) and cynicism (CY). A *high degree of burnout* is reflected in high scores on the (EX) and (CY) subscales and in low scores on the (PE) subscale. An *average degree of burnout* is reflected in average scores on the three subscales. A *low degree of burnout* is reflected in low scores on the (EX) and (CY) subscales and in high scores on the (PE) subscale. The scores for each subscale are considered separately and are not combined into a single, total score. Thus, three scores are computed for each respondent.

Data analysis

A scoring key for the Maslach Burnout Inventory was used to score high, medium, or low exhaustion (EX), cynicism (CY), and professional efficacy (PE). These subscales were used to assess job burnout. Results of a demographic survey are summarized in Table 1. *t*-tests were used to compare differences in the impact of job burnout in men and women. *t*-tests also compared impact of job burnout between technical writers and technical illustrators/designers. The analysis of variance between age group and MBI subscales was compared using ANOVA. Analysis of variance between years on job and MBI subscales was also compared using ANOVA.

Procedures

The first procedure in conducting this survey was to obtain management support. Next, 41 technical writers and 43 illustrators/designers in the Technical Information Department at Lawrence Livermore National Laboratory were sent a demographic survey, along with the MBI-GS survey. Attached was a letter of purpose, stating the importance of giving honest answers, of answering all questions, and of returning the survey by a certain date. Confidentiality of the survey was stressed. Subjects were also given an addressed envelope to return the survey. Fifty-four surveys were returned—a 64% response rate.

CHAPTER IV

Results

Overview

This study compared the differences in the impact of job burnout between technical writers and technical illustrators/designers in the Technical Information Department at Lawrence Livermore National Laboratory, Livermore, CA, and in impact of job burnout in men and women in these professions. The study also compared variance between age group and Maslach Burnout Inventory-General Survey (MBI-GS) subscales of exhaustion (EX), cynicism (CY), and professional efficacy (PE), and variance between years on the job and MBI-GS subscales of (EX), (CY), and (PE). All individuals surveyed filled out a demographic information sheet and the MBI-GS, that consisted of 16 questions to test the degree of (EX), (CY), and (PE) for each subject.

This chapter contains sections on background information, and the results related to the research questions. Chapter V includes limitations, discussion and conclusions of this study, and recommendations for future research.

Background Information

Surveys were sent to 41 technical writers and 43 technical illustrators/designers at LLNL. Of the 84 surveys sent, 54 (64%) were returned. Responses were received from 29 (71%) of the technical writers surveyed; 10 men and 19 women. Responses were received from 25 technical illustrators/designers (58%); 16 men and 9 women. Thirty-one percent (31%) of respondents were male and 33% were female. Sixty-two percent (62%) of the males are technical writers, compared to 32% female technical writers. Thirty-eight percent (38%) of males and 68% of females are technical illustrators/designers.

Age questions were grouped: Under 30, 30-39, 40-49, 50-59, 60 and over. Years of service were grouped: Under 1 year, 1-5, 6-10, 11-15, 16-20, and 20 or more. Subjects in the

technical writer category range in age from 20s to 60s and years at LLNL range from under one year to more than 20 years. Subjects in the technical illustrator/designer category range in age from 30s to 60s and years at LLNL range from the 6-10 year category to more than 20 years. The largest segment of technical writers and technical illustrators/designers are in the 40-49 age range—26% of the entire sample. The largest segment of technical writers and technical illustrators/designers have been at LLNL between 6 and 20 years—51% of the entire sample—with most technical writers in the 6-10 year category (31%), and most technical illustrators/designers in the 11-15 year category—40% of the entire sample). The demographic and background information for the respondents can be found in Table 1.

Results Related to Research Questions

Research question one: To what extent does job classification, specifically technical writer and technical illustrator/designer, impact job burnout as measured by the MBI-GS? Data for this question was measured by the subscales (EX), (CY), and (PE) on the MBI-GS (see page 20 for scoring information).

Results of independent scores on the t-tests run on each of the subscales (Table 2) show no significant difference in exhaustion (EX), no significant difference in cynicism (CY), and no significant difference in professional efficacy (PE) between technical writers and technical illustrators/designers, at the .05 level.

Research question two: To what extent do these technical occupations impact job burnout in males and females, as measured by the subscales (EX), (CY), and (PE), on the MBI-GS?

Scores from the MBI-GS subscales were used to conduct t-tests to compare males and females from both job classifications. The results (Table 3) show no significant difference in exhaustion (EX), no significant difference in cynicism (CY), and no significant difference in

professional efficacy (PE) between men and women.

Research question three: To what extent does age impact job burnout in technical writers and technical illustrators/designers?

Results of ANOVA tests (Table 4) show that there was no significant difference in exhaustion (EX), no significant difference in cynicism (CY), and no significant difference in professional efficacy (PE) among age groups. For analysis, age groups were merged by (a) those up to age 39, (b) those from 40 to 49, and (c) those 50 and over.

Research question four: To what extent does years on the job impact job burnout?

ANOVA tests (Table 5) show that there was no significant difference in exhaustion (EX), no significant difference in cynicism (CY), and no significant difference in professional efficacy (PE) between the three groups. For analysis of years on the job, groups were sorted by (a) those up to 10 years, (b) those from 11 to 15 years, and (c) those on the job 16 years or more.

Summary

Although no significant difference in (EE), (CY), and (PE) was found between men and women, or between job class, age, or years on the job, it must be noted that different people with different social and family circumstances will respond differently. One may be under more stress on the day they filled out the survey than another. There is no simple answer to the number of variables present related to the fit between personal attributes and the work/non-work sphere of each individual. Even though men and women in a job may have similar capabilities, views and preferences, they each live in different social spheres and face different social forces each day.

TABLE 1
Demographic Information

Variable/Category	Sample (n = 54)		Technical Illustrators/ Designers (n = 25)		Technical Writers (n = 29)	
	f	%	f	%	f	%
<u>Gender</u>						
Male	26		16		10	
Female	28		9		19	
<u>Age</u>						
(Under 30)	1		0		1	
(30-39)	11		9		2	
(40-49)	22		10		12	
(50-59)	17		6		11	
(60 or over)	3		0		3	
<u>Years of Service</u>						
(Under 1)	3		0		3	
(1-5)	4		0		4	
(6-10)	15		6		9	
(11-15)	14		10		4	
(16-20)	14		7		7	
(20 or more)	4		2		2	

TABLE 2

t-Tests: Two-Sample Equal Variances

	Technical Illustrators/ Designers	Technical Writers
Job by (EX) Exhaustion	23.59 _a	23.16 _a
Job by (CY) Cynicism	17.17 _a	16.64 _a
Job by (PE) Professional Efficacy	13.0 _a	12.84 _a

Note: Means in the same row that do not share the same subscripts differ at the $p < .05$ for the two-tailed, t-test between mean scores.

TABLE 3

t-Tests: Two-Sample Equal Variances

	Males	Females
Gender by (EX) Exhaustion	24.35 _a	22.50 _a
Gender by (CY) Cynicism	16.65 _a	17.18 _a
Gender by (PE) Professional Efficacy	13.12 _a	12.75 _a

Note: Means in the same row that do not share the same subscripts differ at the $p < .05$ for the two-tailed, t-test between mean scores.

TABLE 4

ANOVAAge Group by EX

Source of Variance	df	SS	MS	F
Between (factor)	2	235.72	117.86	1.80*
Within (error)	51	3343.11	65.55	
TOTAL	53	3578.83		

*Not significant, $p > .05$

Age Group by CY

Source of Variance	df	SS	MS	F
Between (factor)	2	14.78	7.39	1.14*
Within (error)	51	330.92	6.49	
TOTAL	53	345.70		

*Not significant, $p > .05$

Age Group by PE

Source of Variance	df	SS	MS	F
Between (factor)	2	6.29	3.15	.30*
Within (error)	51	529.41	10.38	
TOTAL	53	535.70		

*Not significant, $p > .05$

TABLE 5
ANOVA

Years by EX

Source of Variance	df	SS	MS	F
Between (factor)	2	129.74	64.87	.96*
Within (error)	51	3449.10	67.63	
TOTAL	53	3578.84		

*Not significant, $p > .05$

Years by CY

Source of Variance	df	SS	MS	F
Between (factor)	2	28.80	14.40	2.32*
Within (error)	51	316.90	6.21	
TOTAL	53	345.70		

*Not significant, $p > .05$

Years by PE

Source of Variance	df	SS	MS	F
Between (factor)	2	14.68	7.34	.72*
Within (error)	51	521.02	10.22	
TOTAL	53	535.70		

*Not significant, $p > .05$

CHAPTER V

Discussion

Limitations

As discussed in Chapter 1, possible limitations of this research may be that, because the results are specific to the Lawrence Livermore National Laboratory Technical Information Department, the culture at this national laboratory may be significantly different from other technical organizations. It is a government-contracted, university-managed, research and development organization. Another limitation may be that, even though the respondents were anonymous, there may have been a tendency on the part of respondents to answer the questions in a more positive manner in order to make themselves appear to be happy in their job.

Discussion

Data results for all questions on (EX), (CY), and (PE) showed no significant difference between males and females, technical writers and technical illustrators/designers, in age or years on the job. According to Maslach, et al. (1996), Cynicism is expected to be positively correlated with exhaustion and negatively correlated with professional efficacy. I found that, even though in female technical writers 79% showed moderate to high exhaustion (EX), cynicism (CY) was low to moderate and professional efficacy was moderate to high—74%. Out of 9 female technical illustrators/designers, 89% reported moderate to high (EX); 100% reported low to moderate (CY) with moderate to high (PE). Therefore, 82% of females (technical writers and technical illustrators/designers) reported moderate to high (EX) and 82% reported low to moderate (CY) and moderate to high (PE).

From 10 male technical writers surveyed, 70% reported moderate to high (EX), while 90% scored low to moderate on (CY) and moderate to high on (PE). One person scored high on (EX), low on (CY), and low on (PE). It is expected that if you score low on (CY) you score high on (PE). From 16 male technical illustrators/designers, 75% reported moderate to high (EX), while 87.5% reported low to moderate (CY) and moderate to high (PE). Thus, 73% of males

reported moderate to high (EX) and 88% reported low to moderate (CY) and moderate to high (PE).

Results show that the majority of technical writers (29 male and female subjects), 76%, reported moderate to high (EX) and 79% reported low to moderate (CY) with moderate to high (PE). Results also show that 80% of the 25 male and female technical illustrators/designers surveyed reported moderate to high (EX) and 92% reported low to moderate (CY) with moderate to high (PE).

Overall, (EX) is high in the Technical Information Department at Lawrence Livermore National Laboratory. This could be due to a recent voluntary separation program, where 10% of TID employees took advantage of the program, leaving more work for those left. Another reason for so much (EX) could be that LLNL is a scientific organization; writing and illustrating occupations there are highly technical. These employees support scientific and engineering personnel in their communication needs. Also, LLNL has acquired two very large scientific and computational projects that have begun to generate a lot of work.

Even though (CY) is expected to positively correlate with (EX), the majority of TID employees have moderate to high (EX) and low to moderate (CY). It seems that, even though TID employees experience moderate to high (EX), they are not cynical about their jobs. Cynicism (CY) is expected to negatively correlate with professional efficacy. This proved true in TID. In the majority of technical writers and technical illustrators/designers, (CY) was low to moderate and (PE) was moderate to high. The implications are that TID employees are satisfied with accomplishments and expectations of continued effectiveness, and that cynicism is generally low.

Conclusion

This study of technical writers and technical illustrators/designers at Lawrence Livermore National Laboratory documents a difference in outcome from the Maslach theory. Maslach, et al. (1996) propose that “employees develop indifference and cynicism about their work in order to gain distance from its exhausting demands.” They say that this reaction is expected to be dysfunctional in that cynicism reduces the energy available for performing work and for developing

creative solutions to the work-related problems. It was expected that high (EX) and high (CY) go hand-in-hand. But, as shown in this study, high exhaustion does not necessarily result in cynicism or vice versa. Employees of TID are generally highly educated and report to have high professional efficacy. The implications are that they can evaluate the reasons for their moderate to high (EX) and understand the causes without sacrificing high work standards.

Results of tests originally done by Maslach & Jackson (1981) in the human services field showed differences in scores for men and women, and that burnout varied by age. Results also showed that more education was associated with higher scores on exhaustion and lower scores on depersonalization. The survey results discussed in this paper showed no difference in scores for men and women and no burnout variance by age. But, considering the highly educated respondents of this survey, there could be a correlation between education and higher scores on exhaustion (EX), plus the lower scores on cynicism (CY) parallel lower scores on depersonalization found on earlier Maslach & Jackson tests.

This study included almost equal men and women (41 women, 43 men), although there were 26 female and 15 male technical writers as opposed to 15 female and 28 male technical illustrators/designers. Men and women, even though working in the same jobs and presumably possessing the same capabilities, would be expected to show differences in scores on the MBI-GS subscales (EX), (CY), and (PE). There would be expected a factor of different social contexts affecting answers. But, this study showed no significant difference in any of the subscales.

In fact, considering that results of this study showed no significant differences, it brings up the question of whether the measurement tool has validity. Is Lawrence Livermore National Laboratory such a great place to work that no one experiences job burnout? Or, perhaps those who are experiencing burnout did not want to participate in the survey, regardless of anonymity.

Recommendations

Further study of job burnout in technical organizations could provide more solid clues about what causes burnout. Continued studies, with reconfigured questions, could give perspectives for analyzing job conditions that contribute to burnout and conditions that are conducive to

preventing burnout. By using an established survey and scoring key, there was no method for measuring job conditions as a cause of burnout.

The challenge for any organization is to make it possible for individuals to have options congruent with their needs, for example, days off or flextime, in order to alleviate occurrence of stress and exhaustion. Job stress and exhaustion can be a precursor to job burnout. Employees must be able to recognize severe exhaustion in themselves, and they must be able to let their supervisors know when the pressure becomes too much. Companies must be willing to admit that exhaustion is not good and that employee health comes before deadlines. Instead of treating job burnout as a stigma, there needs to be an awareness in individuals and in management that job burnout could happen. Even though this study shows little sign of burnout in TID employees to date, a constant vigil must take place in order to recognize the signs of job burnout.

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APPENDIX A

Memorandum of Understanding

Group No. H2397

Memorandum of Understanding

		
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Instructor	Address	Telephone

1. Title: A Study of Job Burnout in Technical Editors/Writers and Technical Illustrators/Designers at Lawrence Livermore National Laboratory

2. Statement of the Problem: Job stress can be a precursor to job burnout. Burnout is a loss of motivation, and antidotes for job stress will not necessarily alleviate or stop job burnout. Job burnout is experienced as exhaustion on physical, emotional, and cognitive levels. Burnout can include withdrawal and decreasing involvement on the job, seriously affecting job satisfaction, turnover, absenteeism, and productivity. Rather than treating job burnout as something that detracts from the character or reputation of an employee, supervisors need to be aware of signs and causes of job burnout in order to prevent its occurrence. They need to realize that job burnout differs from job stress. The first step is to recognize that burnout can, does, and will happen.

3. Research Objectives: This research project will examine whether job burnout exists in the Technical Writer and Technical Illustrator/Designer occupations in the Technical Information Department at Lawrence Livermore National Laboratory. This study will determine at what age these employees are most likely to experience job burnout, whether it affects men or women most, if writers in a technical organization experience job burnout more than illustrators/designers in that organization, and to what extent years on the job impact job burnout.

4. Research Method: Forty-two illustrators/designers and 44 writers in the Technical Information Department at Lawrence Livermore National Laboratory will be sent a demographic survey, along with the MBI—GS survey. Attached will be a letter of purpose, stating the importance of giving honest answers, of answering all questions, and of returning the survey by a certain date. Confidentiality of the survey will be stressed. Subjects will also be given an addressed envelope to return the survey. A scoring key for the Maslach Burnout Inventory will be used to score high, medium, or low emotional exhaustion (EE), depersonalization (DP), and professional accomplishment (PA). These subscales are used to assess job burnout. Data will be analyzed using *t*-tests and ANOVA to compare variables.

5. Projected Completion Date: March 1, 1998.

APPENDIX B
Cover Letter
MBI-GS Survey
Demographic Survey

February 17, 1998

TO: TID Writers/Illustrators/Designers
FROM: Judy Rice
SUBJECT: Survey

I am a student in the Organizational Behavior degree program at the University of San Francisco. In order to fulfill the degree requirements for graduation, I am conducting a research project that studies job stress and burnout.

This study is not intended to single out individual persons or groups, or to lay blame on individuals, groups or departments. Research has been done regarding stress in the workplace for other professions. By conducting this study, I hope to contribute to a better understanding of job stress and burnout.

All Technical Writers and Technical Illustrators/Designers in TID are being surveyed. This survey is solely for the purpose of college research and all participants will remain anonymous. There will be no publication of individual answers.

Please take a few moments to answer *all* of the questions and answer them honestly. Return the surveys in the enclosed addressed envelope by March 4, 1998; please seal the envelope. Anonymity is guaranteed.

If you would like information about the findings of this research, I will be happy to share them with you at the end of the project. If you have any questions or concerns, please contact me at 2-7647 (work) or 510-443-4555 (home). Thank you for contributing to this research project.

Judy Rice
TID Graphic Designer

MBI—General Survey

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

**How Often
0–6**

Statements:

1. _____ I feel emotionally drained from my work.
2. _____ I feel used up at the end of the workday.
3. _____ I feel tired when I get up in the morning and have to face another day on the job.
4. _____ Working all day is really a strain for me.
5. _____ I can effectively solve the problems that arise in my work.
6. _____ I feel burned out from my work.
7. _____ I feel I am making an effective contribution to what this organization does.
8. _____ I have become less interested in my work since I started this job.
9. _____ I have become less enthusiastic about my work.
10. _____ In my opinion, I am good at my job.
11. _____ I feel exhilarated when I accomplish something at work.
12. _____ I have accomplished many worthwhile things in this job.
13. _____ I just want to do my job and not be bothered.
14. _____ I have become more cynical about whether my work contributes anything.
15. _____ I doubt the significance of my work.
16. _____ At my work, I feel confident that I am effective at getting things done.

(Administrative Use only)

EX: _____ CY: _____ PE: _____

MBI—General Survey

The purpose of this survey is to assess how staff members view their job and their reactions to their work.

On the following page there are 16 statements of job-related feelings. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, write a "0" (zero) in the space before the statement. If you have had this feeling, indicate how often you feel it by writing the number (from 1 to 6) that best describes how frequently you feel that way. An example is shown below.

Example

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

How Often

0–6

Statement:

I. _____ I feel depressed at work.

If you never feel depressed at work, you would write the number "0" (zero) under then heading "How often." If you rarely feel depressed at work (a few times a year or less), you would write the number "1." If your feelings of depression are fairly frequent (a few times a week, but not daily) you would write a "5."

Note to Researchers

We would appreciate your contribution to establishing occupational and national norms for the MBI—GS. If you wish to contribute, please send survey data on computer disks. Include on the disks item by item data files on all subjects along with whatever demographic data you have collected. Include on the disk a text file identifying the researchers, describing the nature of the sample, and outlining the structure of the data file. Your contribution will be acknowledged in the next edition of the MBI Manual.

Send files to:

Michael P. Leiter, Ph.D.

Centre for Organizational Research & Development

Acadia University

Wolfville, NS, Canada B0P 1X0.

CPP

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DEMOGRAPHIC SURVEY

1. What is your age? Check one.

(under 30)____ (30-39)____ (40-49)____ (50-59)____ (60 or older)____

2. Male_____ Female_____

3. How many years have you worked at LLNL? Check one.

(under 1)____ (1-5)____ (6-10)____ (11-15)____ (16-20)____ (20 or more)____

5. Job classification.

Technical writer_____

Technical illustrator/designer_____

Other_____

6. Degree (if any). Check all that apply.

(A.A.)____ (B.A.)____ (B.S.)____ (M.A.)____ (M.S.)____

Subject of degree(s):

University of California
Lawrence Livermore National Laboratory
Technical Information Department
Livermore, CA 94551

